

Whales in a Noisy Ocean

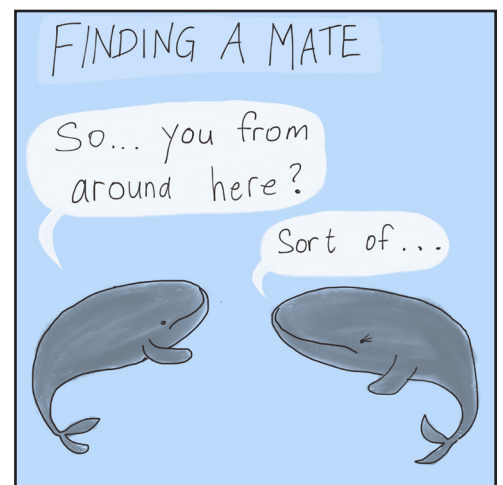
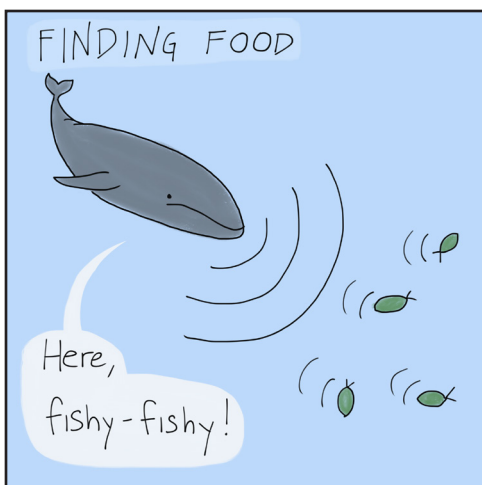


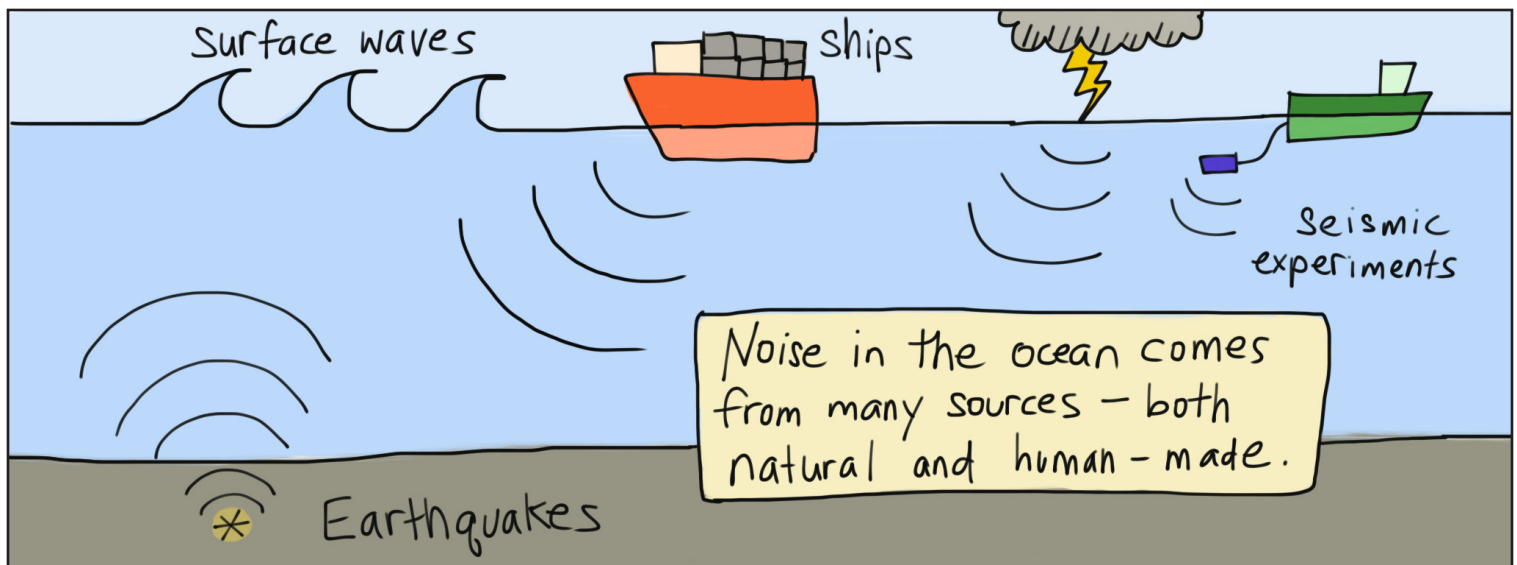
In the ocean, sound rules. Unlike on land, where animals (just like us humans!) get a lot of information from light, animals in the ocean have evolved to take advantage of sound, which is much more effective than light under water. Light gets absorbed quickly, but some sounds, like the low-frequency calls of blue whales, can travel hundreds of kilometers under water, under the right conditions. Whales have developed really fascinating ways of using moans and clicks and songs to help them get the things they

need in life - friends, mates, food... what more could a whale want?

Some whales find food by making sounds and then listening for echoes that bounce off of their prey. Using those echoes, they can figure out where their food is (mmm, delicious fish!). Whales can also use sound to communicate with each other. A mother and calf might need to keep track of each other as they swim. Or a male might show off his sweet singing voice to attract a female.

Unfortunately, noise in the ocean is





on the rise, and it's making life tougher for whales. Some of the sources of human-caused noise include ship traffic, seismic exploration for oil & gas and sonar testing. It's worth noting, though, that there is noise in the ocean that is not caused by humans. Earthquakes, volcanoes, breaking waves, rain and even lightning are some of the things that add to the background noise. The thing is, whales have spent thousands of years evolving to deal with these natural noise sources - but in the last few decades they have suddenly had to get used to the growing din caused by human activities. And, as Chris Clark from the Bioacoustics Research Program at Cornell University explains, "it's not just one ship. It's ten thousand ships". It's the same as if only one person litters on the side of the road, it might not be such a big deal. The problem arises when everyone does it, all at the same time.

Scientists are still not sure exactly how noise affects whales - different whales might be more or less sensitive to particular sounds, and might respond in different ways. For example, right whales in the Bay of Fundy showed lower levels of stress hormones when ship traffic stopped briefly following the 9-11 terrorist attacks [1]. Killer whales off the coast of Washington state and British Columbia have increased the volume of their calls so that they can be heard above vessel traffic [2]. And in the most severe cases, some beaked whale strandings have been linked to mid-fre-

quency naval sonar operations [3].

Excessive noise in the ocean causes a sort of masking effect - meaning that the noise is loud enough that the whales can't hear what they normally would need to hear in their environment, whether it's echoes from fish, or a signal from another whale. Not being able to find a mate or find food or find each other is a serious problem, especially for species that are already endangered.

But there is still hope. Now that we're starting to realize how harmful noise can be, we're finally in a position to actually do something about it. Small steps can make a big difference. Even slowing ships down can substantially reduce the overall noise. In recent years, the US Navy has funded a lot of basic research that has taught us a huge amount about how marine mammals hear and use and produce sounds. We've still got a long way to go, but now that we're aware that there is a problem, we can work on ways to fix it.

Learn more about the **Bioacoustics Research Program** here: <http://www.birds.cornell.edu/brp/>

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[1] <http://news.sciencemag.org/sciencenow/2012/02/shh-ocean-noises-stress-out-wha.html>

[2] Holt, Marla M., et al. "Speaking up: Killer whales (*Orcinus orca*) increase their call amplitude in response to vessel noise." *The Journal of the Acoustical Society of America* 125.1 (2008): EL27-EL32.

[3] D'Amico, Angela, et al. *Beaked whale strandings and naval exercises*. SPACE AND NAVAL WARFARE SYSTEMS CENTER SAN DIEGO CA, 2009.